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明 細 書

1. 発明の名称

複合アルミニウム鋳物

2. 特許請求の範囲

アルミニウム合金を基材とした鋳物の応力集中部に、貫通孔を形成した鉄鉄を鋳包み、部分補強を施したことを特徴とする複合アルミニウム鋳物。

3. 発明の詳細な説明

産業上の利用分野

本発明は、自動車部品の軽量化と強度アップをはかった複合アルミニウム鋳物に関するものである。

従来の技術

従来より自動車部品の重要保安部材は、すべて鉄系材質が使用されて来たが、自動車自体の軽量化のニーズおよびエンジンの性能アップに対し、部品の軽量化が必要である。

発明が解決しようとする問題点

従来、自動車部品に使用されている鉄系材質は、主としてFCD45材である。これに対する軽

化の代替材として高強度、高靱性のアルミニウム合金を適応させているが、剛性に限界があり、靱性の改善をはかるため、肉圧を増したりして剛性を得ようとするが、重量の面で軽量効果が得られるという問題点がある。

本発明は、軽量にして、強度が必要とする部分には強度の改善を計った複合アルミニウム鋳物の提供を、目的とする。

問題点を解決するための手段

本発明は、上記の問題点を解決するために、アルミニウム合金を基材とした鋳物の応力集中部に、貫通孔を形成した鉄鉄を鋳包み、部分補強を施した複合アルミニウム鋳物にある。

作 用

アルミニウム合金を基材とした鋳物の応力集中部に鉄鉄を鋳包んだことにより、アルミニウム合金本来の軽量を、さ程損なうことなく、強度を必要とする部分の強度を上げることができ、かつ、鉄鉄に貫通孔を形成したので、アルミニウム合金材とのめれ性(キラワレ現象)がよくなり、強靱

に固定される。

実施例

以下、本発明の実施例を、図面に基づいて説明する。

ここで、第1図ないし第4図は、本発明の一実施例に係るディスクブレーキ用ボディキャリバーの構成を示すもので、第1図は、ボディキャリバーの平面図、第2図は、第1図のA-A断面図、第3図は、同斜視図、第4図は、ボディキャリバー基体に被包むインサートの一例を示す斜視図、第5図は、ディスクブレーキの動作説明図である。

同図において、1は、アルミニウム合金からなるディスクブレーキのボディキャリバーの基体、2は、ボディキャリバー基体1に穿設されたシリンダー孔、3は、シリンダー孔2に対抗して設けられた受止部、4は、ボディキャリバー基体1の応力集中部に被包まれた鋳鉄からなるインサートである。

まず、ディスクブレーキの構造および作用を、第5図にて説明すると、ボディキャリバー基体1

に適合して設けられたブレーキ板5を、ボディキャリバー基体1のシリンダー孔2に装着されたシリンダーを作動させ、シリンダーロッド6に固着されたバット7をブレーキ板5に押付けて、該ブレーキ板5をバット7を介してボディキャリバー1の受止部3に圧接してブレーキ板5の回転を停止させるものである。

上記のように、ブレーキの作動にあたっては、ボディキャリバー基体1の受止部3には、強度の応力が集中する。しかるに、ボディキャリバー基体1は、軽量化のためアルミニウム合金を使用したものであるから強度の補強が必要となる。本実施例においては、このボディキャリバー基体1の製造時に、第4図に示すような貫通孔8を複数個設けられたL字形に形成されたインサート4を、ボディキャリバー基体1の受止部3に到るように内部に被包んだものである。このL字形は、耐応力設計により形状設計したものであり、また、貫通孔8を設けたのは、鋳鉄製インサート4がアルミニウム合金製ボディキャリバー基体1とぬれ性

(キラワレ現象)をよくするためで、インサート4の被包みにおいて、アルミニウム合金溶湯が貫通孔8を貫通して凝固するため、インサート4がボディキャリバー基体1に固定され、ガタ付き等がない、強度に優れた鋳造製品が得られる。

なお、インサート4の形状は、L字形に止まらず、耐応力設計により種々の形状が適応される。

以上説明したように、本実施例に係るディスクブレーキ用ボディキャリバーは、アルミニウム合金を基材とした鋳物の受止部3を含めた応力集中部に、貫通孔8を設けたL字形鋳鉄製インサート4を被包み、部分補強を実施したものである。したがって、従来の全体が鋳鉄製のボディキャリバーより重量が軽量で、強度が必要とする部分は補強がなされているので強度上問題はない。

発明の効果

以上述べたように、本発明は、総合して、軽量にして、強度を必要とする部分は、強度を充分有する複合アルミニウム鋳物を所期できるもので、実用的効果に優れた発明といえることができる。

4. 図面の簡単な説明

第1図ないし第4図は、本発明の一実施例に係るディスクブレーキ用ボディキャリバーの構成を示すもので、第1図は、ボディキャリバーの平面図、第2図は、第1図のA-A断面図、第3図は、同斜視図、第4図は、ボディキャリバー基体に被包むインサートの拡大斜視図、第5図は、ディスクブレーキの動作説明図である。

1…ボディキャリバー基体、4…インサート、8…貫通孔。

特許出願人

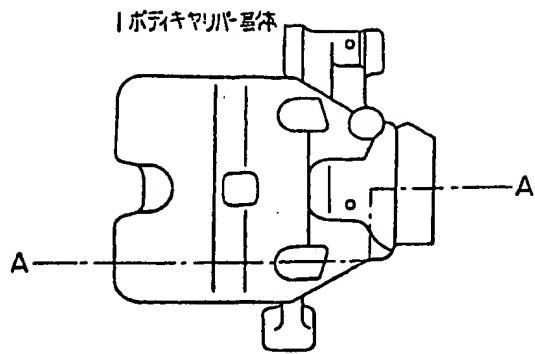
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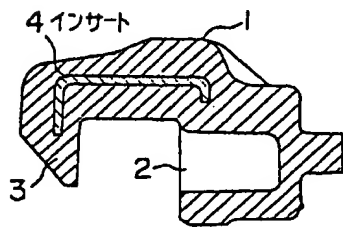
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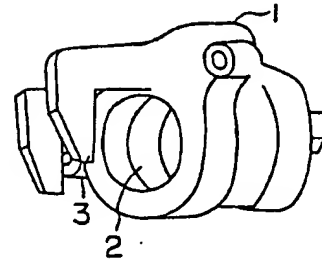
第1図



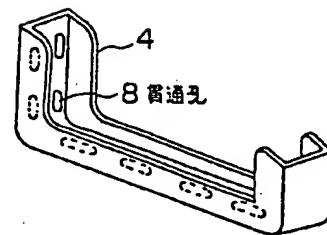
第2図



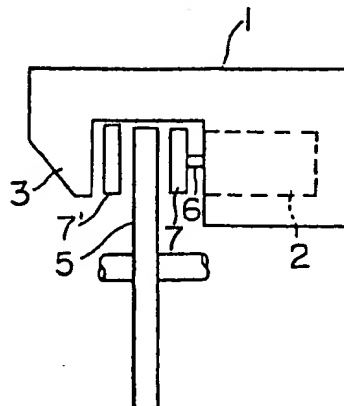
第3図



第4図



第5図



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(71) Patent Assignee: Hitachi Metal Company

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[Note: The fax quality was very poor. Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.]

Description of the Invention

1. Name of the invention

Composite Aluminum Casting

2. Scope of the claims of the invention

Composite aluminum casting characterized by the fact that in the stress concentration part of a casting that has an aluminum alloy as its base material, holes are formed and a cast iron is cast and included and a partial reinforcement was performed.

3. Detailed Explanation of the Invention

Technological Sphere of Application

The present invention is an invention about a composite aluminum casting that provides automobile parts that reduce the weight and increase the strength

Previous Technology

In the past, an iron type material was used for all of the important holding parts of the automobiles, however, relative to the needs for making the weight of the automobile body itself lighter and relative to the increase of the performance of the engines, it is necessary that the parts be made to be light weight.

Problem points solved by the present invention

In the past the iron type material that has been used in the automobile parts has mainly been an FCD 45 material. And relative to that, as a representative material for the achievement of light weight, a high strength, high hardness aluminum alloy has been appropriately used, however, there has been the problem that the rigidity properties are limited and in order to improve the rigidity properties, the physical pressure is increased and the rigidity properties are achieved, however, from the point of view of the achievement of the light weight the results are diminished.

The present invention is an invention that has as a goal to suggest a composite aluminum casting that is made to be lightweight and where in the parts where strength is required a strength improvement is designed in.

Measures in order to solve the problems

The present invention, in order to solve the above described problem points, is a composite aluminum casting where in the stress concentration part of a casting that has an aluminum alloy as its base material, holes are formed and a cast iron is cast and included and a partial reinforcement was performed.

Effect

Through the casting and incorporation cast iron in the stress concentration part of a casting that has an aluminum alloy as its base material, without deteriorating the lightweight characteristic inherent to the aluminum composite material, the strength of the parts where strength is required, can be increased, and also, because of the fact that the cast iron is formed in the piercing openings, the wetting properties relative to the composite aluminum material (non-separation phenomenon) become good, and it is strongly fixed.

Practical Examples

Then, here below, the practical implementation examples of the present invention will be explained in further details based on the diagrams.

Here, Figures 1 through 4, represent the structure of the body caliber used in the disc brake that is used as one practical implementation example of the

present invention. Figure 1 is a figure that represents a horizontal (top) view diagram, Figure 2 is a sectional view diagram along the A – A line shown in Figure 1, Figure 3 is a three-dimensional diagram of the same, and Figure 4 is a three-dimensional diagram showing one example of an insert that is cast and incorporated into the body caliber main body. Figure 5 is a diagram for the explanation of the action of the disc brake.

In the same figures, 1 represents the main body of the body caliber of the disc brake, which is made of the aluminum alloy material, 2 represents the cylindrical hole that has been pierced into the main body 1 of the body caliber, 3 represents the stop part that is provided so that it counteracts the cylindrical hole 2, 4 represents the insert which is formed from cast iron that is cast and incorporated into the stress concentration part of the main body 1 of the body caliber.

First, if we are to explain the structure and the action of the disc brake according to the presented in Figure 5, the brake plate 5, that is provided as it is combined with the main body 1 of the body caliber, activates the cylinder that is attached to the cylindrical hole 2 of the main body of the body caliber, and the part 7, which is fixed on the cylinder rod 6, pushes on the brake plate 5, and the above brake plate 5 is pressure adhered on the stop part 3 of the body caliber 1, with the part 7' in between, and the rotation of the brake is terminated.

As in the above described, during the action (motion) of the brake, a strong stress is concentrated onto the stop part 3 of the main body 1 of the body caliber. On the other hand, in order to make it lightweight, the main body 1 of the body caliber, is formed by using an aluminum alloy material, and because of that a strength reinforcement becomes necessary. According to this practical implementation example, as it is shown according to the presented in Figure 4, in the number of pierced holes 8 that have been provided, at the time of the casting of this main body 1 of the body caliber, the inserts 4, that are formed in an L-letter shape, are cast and incorporated in the inner part so that they reach to the stop part 3 of the main body 1 of the body caliber. This L-letter shape is designed by using a stress resistance providing design. And also, when the pierced holes 8 are provided, in order to make the wetting properties (non-separation phenomenon) of the inserts 4, that are manufactured from cast iron, relative to the main body 1 of the body caliber, which is manufactured from aluminum alloy material, good, during the casting and incorporation of the inserts 4, because of the fact that hot

molten aluminum alloy passes through the pierced holes 8 and it is solidified, the inserts 4 are fixed onto the main body 1 of the body caliber, and there is no stiffening etc., and it is possible to obtain a cast manufactured product with excellent strength.

Moreover, regarding the shape of the inserts 4, it is not limited to the L-letter shape, and according to the stress resistant design, it is possible to appropriately use different types of shapes.

As it has been explained here above, in the case of the body caliber used for disc brake, according to this practical implementation example, it is a body caliber where on the stress concentration part that includes the stop part 3 of the casting, which uses aluminum composite material as its main material, pierced holes 8 are provided, and in those L-letter shaped inserts, manufactured from cast iron, are cast and incorporated, and a partial reinforcement is practically performed. Consequently, because of the fact that the weight is lighter than that in the case of the body caliber according to the previous technology, where the whole body is manufactured from cast iron, and because of the fact that the strength has been reinforced on the part where the strength is necessary, there is no problem regarding the strength properties.

Results from the present invention

As it has been described here above, in the case of the present invention it is possible to anticipate a composite aluminum casting where as a whole it has a lighter weight, and at the part where the strength is necessary, it has sufficient strength, and because of that it is possible to state that it is an invention that has excellent practical use results.

4. Simple explanation of the figures

Figures 1 through 4, represent the structure of the body caliber used in the disc brake that is used as one practical implementation example of the present invention. Figure 1 is a figure that represents a horizontal (top) view diagram, Figure 2 is a sectional view diagram along the A – A line shown in Figure 1, Figure 3 is a three-dimensional diagram of the same, and Figure 4 is an enlarged three-dimensional diagram of an insert that is cast and incorporated into the body caliber main body. Figure 5 is a diagram for the explanation of the action of the disc brake.

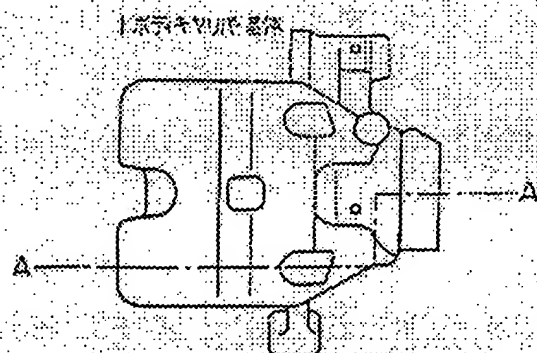
1.....main body of the body caliber, 4.....insert,
8.....pierced holes.

Patent Assignee: Hitachi Metal Company

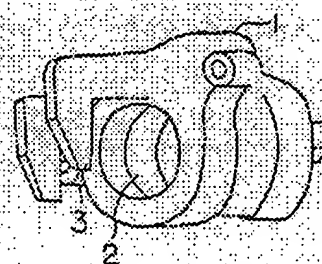
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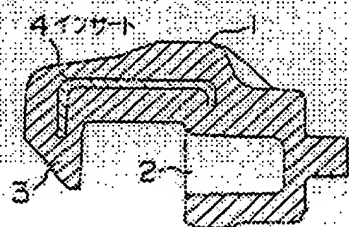
第1図



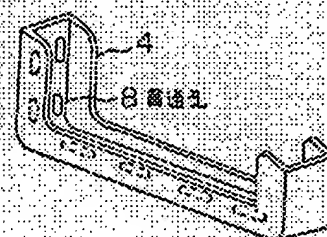
第3図



第2図



第4図



第5図

